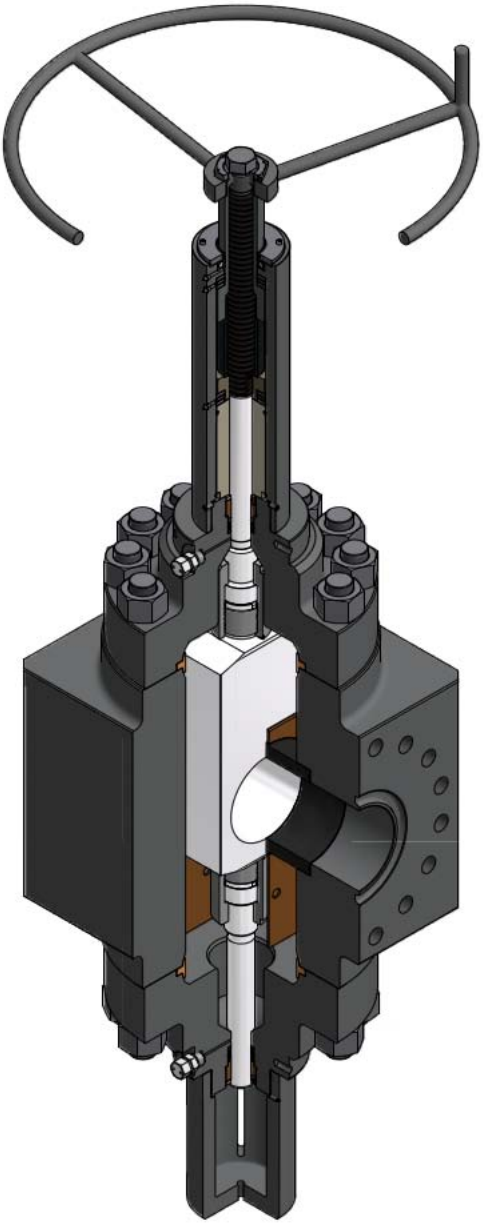
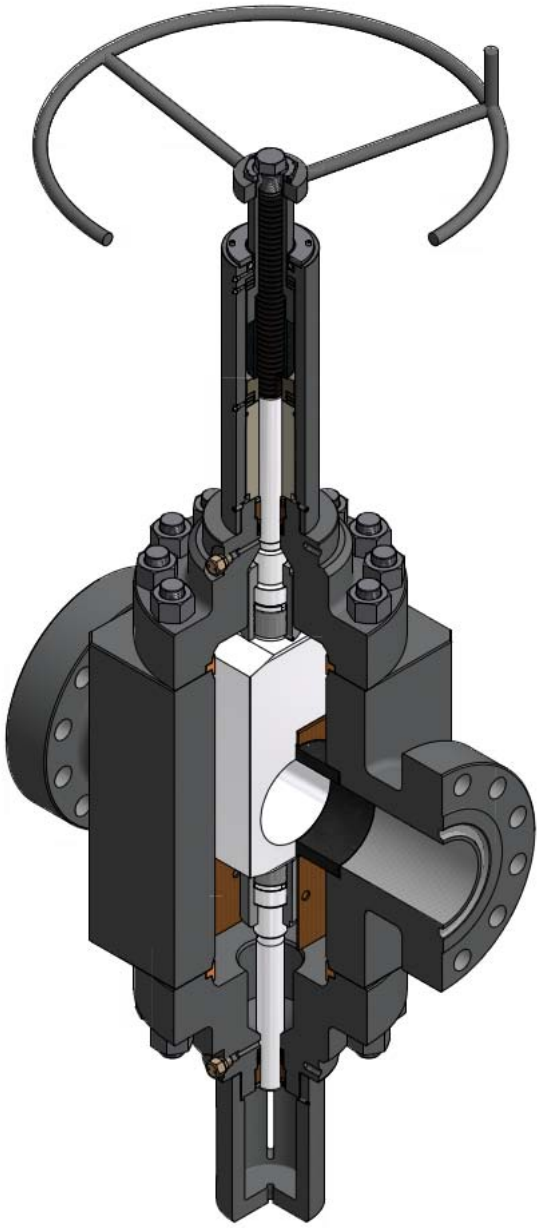
VALVEWORKS USA

OPERATION AND SERVICE MANUAL FOR 7-1/16 INCH MODEL FM1 GATE VALVES



7-1/16” Model FM1 Studded Outlet 10,000-20,000 W.P



7-1/16” Model FM1 Flanged Outlet 10,000 W.P

INTRODUCTION

In appreciation to our customer for purchasing our product, we have prepared this Operation Manual to assist you in the Operation, Maintenance, Assembly and Installation of the Valveworks USA API 6A 7-1/16 inch FM1 Gate Valve. We encourage you to follow recommendations in this booklet to attain the best possible service from our product, which is designed and proven to offer the service one can expect of a quality product. If you need to contact a representative for more specific information pertaining to a special problem, you should contact:

VALVEWORKS USA
1650 SWAN LAKE RD.
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APPLICATIONS

Valveworks USA 7-1/16” FM1 gate valve unit can be applied to the following sizes and working pressures.

APPLICATION	OPTIONS AVAILABLE
Gate valve size	7-1/16”
Valve working pressure	10,000 - 20,000 psi
Temperature range	-60°C to 121°C (-75°F to 250 °F)

The flanged outlet gate valve is rated for 10,000 psi work pressure and the studded outlet gate valve of this product line is rated for 10,000 psi, 15,000 psi and 20,000 psi.

TEMPERATURE RATING

Temperature classification	Operating Range			
	°C		(°F)	
	Min.	Max.	Min.	Max.
K	-60	82	-75	180
L	-46	82	-50	180
N	-46	60	-50	140
P	-29	82	-20	180
S	-18	60	0	140
T	-18	82	0	180
U	-18	121	0	250
V	2	121	35	250

TRIM CHART

Material class	Minimum Material Requirements	
	Body, bonnet, end and outlet connections	Pressure-controlling parts, stems and mandrel hangers
AA - General service	Carbon or low-alloy steel	Carbon or low-alloy steel
BB - General service	Carbon or low-alloy steel	Stainless steel
CC - General service	Stainless steel	Stainless steel
DD - Sour service [a]	Carbon or low-alloy steel [b]	Carbon or low-alloy steel [b]
EE - Sour service [a]	Carbon or low-alloy steel [b]	Stainless steel [b]
FF - Sour service [a]	Stainless steel [b]	Stainless steel [b]
HH - Sour service [a]	CRAs [b]	CRAs [b]

[a] As defined by NACE MR 0175.

[b] In compliance with NACE MR 0175.

As shown by API-6A. For specific details, consult Valveworks USA.

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ORDERING INFORMATION

The following information should be provided with any request for quote or order placement of Valveworks USA 7-1/16" FM1 Gate Valves:

- API 6A Requirements (PR-PSL)
- Temperature Rating (API 6A)
- Material (API 6A)
- Any Special Test Requirements
- Any Special Material Requirements
- Any Special Coating or Protection Requirements
- Other Specifications and/or Certifications

OPERATION

The Valveworks USA Model FM1 gate valves are Ball Screw operated valves. The gate of the **MODEL FM1** Valve is a one piece slab gate that uses two floating seats to generate a highly reliable seal. The slab gate eliminates the chance of trapping pressure within the body cavity which can cause pressure locking.

- Fully open the valve before installing or shipping. The sealing area of the gates, in the full open position, is protected by the body and is less likely to be damaged.
- Do not remove the molybdenum disulfide coating from internal parts. This coating serves as a lubricant and corrosion inhibitor.
- To hydrostatically test the valve body to full API test pressure, the valve **must be** in a partially open position. When testing the valve in the closed position (seat test) **do not** exceed the working pressure stamped on the valve identification plate.
- During storage always leave the valve in the **fully opened or fully closed** position. This will tightly wedge the gate against the seats and prevent damage to the sealing area of both the gate and seats.
- Always remove the valve from service before work is performed on the stem bearings.
- When lubricating the body do not exceed the maximum API working pressure stamped on the identification plate.
- The valve should be fully closed or fully opened during lubrication of the body or seats. Seat lubrication pressures should not exceed the maximum allowable API test pressure.

This method of operation will prevent damage to the sealing surfaces of the gate and seats, and will increase the life of the valve.

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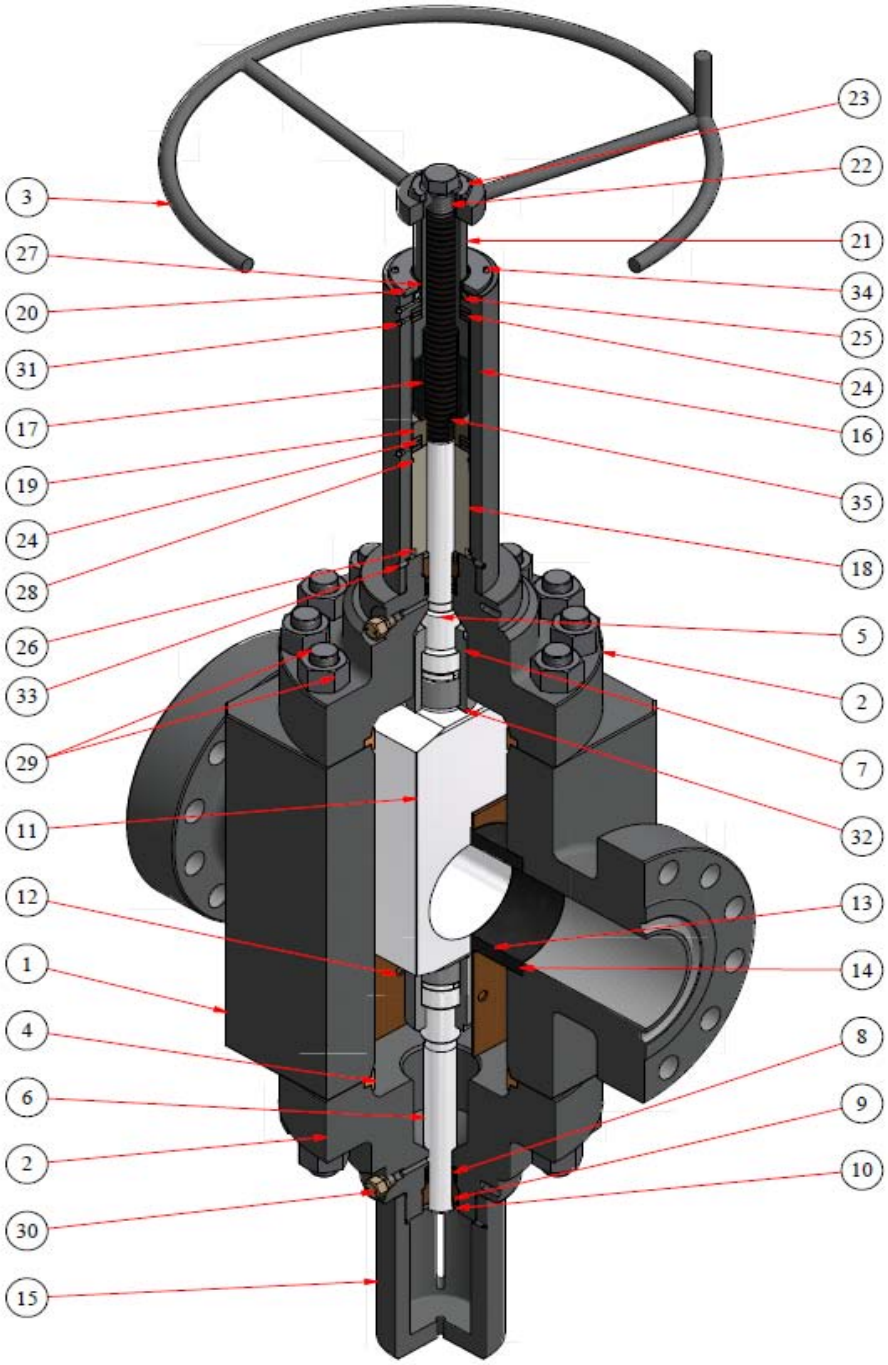
ASSEMBLY DRAWING OF MODEL FM1 GATE VALVE



MODEL FM1
7 1/16" 10,000 P.S.I. (HANDWHEEL OPERATED)
OPERATION: BI-DIRECTIONAL - SLAB GATE
TO OPEN AND CLOSE:
BACKOFF HANDWHEEL 1/4 TURN
(GATE SHOWN IN OPEN POSITION)

FLANGED END

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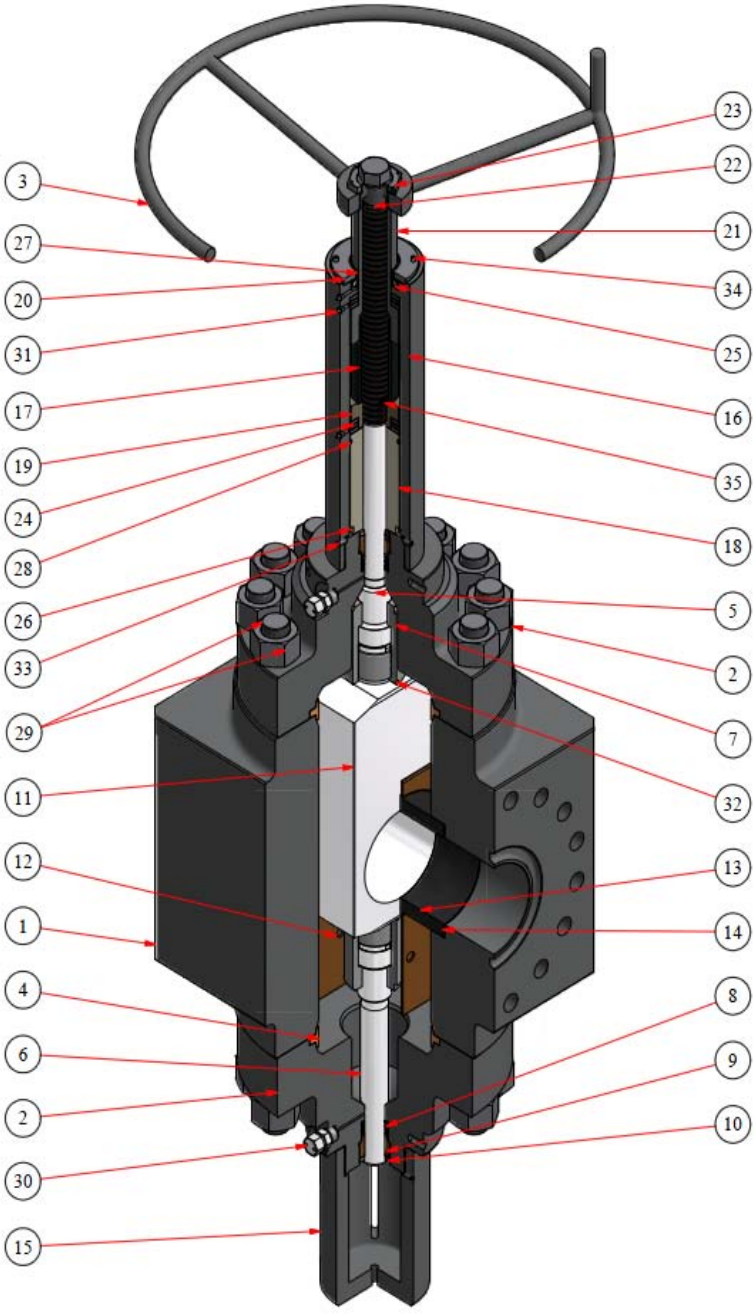

MODEL FM1
7 1/16" 15,000 P.S.I. (HANDWHEEL OPERATED)
OPERATION: BI-DIRECTIONAL - SLAB GATE
TO OPEN AND CLOSE:
BACKOFF HANDWHEEL 1/4 TURN
(GATE SHOWN IN OPEN POSITION)

STUDDED END

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BILL OF MATERIALS

FLANGED OUTLET

ITEM	PART NO	DESCRIPTION	QTY
1	290-FM1-77XY	BODY, FLANGED	1
2	291-FM1-77XY	BONNET	2
3	380-FM1-7700	HANDWHEEL	1
4	313-FM1-77XY	BONNET SEAL RING	2
5	340-FM1-77XY	STEM, OPERATING	1
6	341-FM1-77XY	STEM, BALANCING	1
7	356-FM1-7700	GATE NUT	2
8	351-FM1-7700	PACKING	2
9	352-FM1-7700	PACKING RETAINER NUT	2
10	353-FM1-7700	PACKING RETAINER LOCKNUT	2
11	306-FM1-77XY	GATE, SLAB	1
12	354-FM1-77XY	GATE GUIDE	2
13	321-FM1-77XY	SEAT, FLOATING RC	2
14	334-FM1-77XY	SEAT SEAL, FLOATING RC	2
15	343-FM1-7700	STEM PROTECTOR	1
16	155-FM1-7700	HOUSING, BALL SCREW	1
17	397-7700	BALL SCREW, LH THREAD	1
18	377-FM1-7700	BAERING SPACER, LOWER	1
19	374-FM1-7700	BEARING SPACER, UPPER	1
20	345-FM1-7700	COVER PLATE	1
21	346-FM1-77XY	STEM ADAPTER	1
22	387-FM1-77XY	GLAND, BACKSEAT	1
23	381-FM1-7700	HANDWHEEL NUT	1
24	373-77XY	BEARING INTERNAL- NHTA-5280	2
25	369-77XY	BEARING, EXTERNAL	1
26	348-77XY	SNAP RING, SPIROLOX	1
27	349-77XY	ROD WIPER	1
28	347-7700	O-RING	2
29	096-7700	STUD W/ NUT, B7	24
30	101-0000	BODY GREASE FITTING	2
31	109-0001	ALEMITE GREASE FITTING	3
32	1173261	SET SCREW, 1/4” X 3/4 ” LG.	3
33	1173303	SET SCREW, 3/8” X 3/4” LG.	4
34	1173462	CAP SCREW, 1/4” X 1” LG.	4
35	64313	PIN SPRING	1
	400-0002	GREASE	25 LBS

The last two digits in the part no’s vary with X - “Material Type and Y – “Coating. The table below gives the different available material types and coatings. Please refer to the valve tag to know the material type and coating on the valve parts.

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STUDDED OUTLET

ITEM	PART NO	DESCRIPTION	QTY
1	298-FM1-87XY	BODY, STUDDED	1
2	291-FM1-87XY	BONNET	2
30	103-0000	AUTOCLAVE FITTING	2

The Bill of Material for the flanged outlet and the studded outlet is the same except the ones tabulated above. The body and bonnet vary for the tow products and the studded outlet valve uses Autoclave Fittings instead of Body Grease Fittings.

	MATERIAL TYPE	Y	COATING
1	4130	0	NONE; PHOSPHATE, MOLY, STANDARD PAINT/COATING, POWDER COAT
1A	4140		
1B	1040		
1C	1018		
1D	1020		
1E	SA285-C	1	NITRIDE QPQ-PHOSPHATE; EXCEPTION - FC BODY BUSHING - DO NOT NITRIDE
1F	1026		
2	410SS FORGED		
2A	S42400		
3	174SS		
3A	NITRONIC 50	2	HARDFACE-STELLITE #6 SPRAY & FUSE
4	316SS		
4A	316/304SS		
4B	304SS	3	HARDFACE - TUNGSTEN CARBIDE
5	BRONZE		
6	INCONEL 718		
6A	INCONEL 725	4	HARDFACE - COLMONOY #5
6B	INCONEL X750		
7	MONEL	5	ELECTROLIS NICKEL
8	A487-4D		
8A	A487-4C	6	WELD ON HARDFACE
8B	CA15		
8C	CF8M	7	ZINC PLATE
8D	CF3M	8	XYLAN COATING
8E	CA6NM	9	(4130) INCONEL 625 CLAD
9	STELLITE #6		
9A	PLASTIC	9A	(4130)SS-316-RING GROOVE
9B	STELLITE #3		

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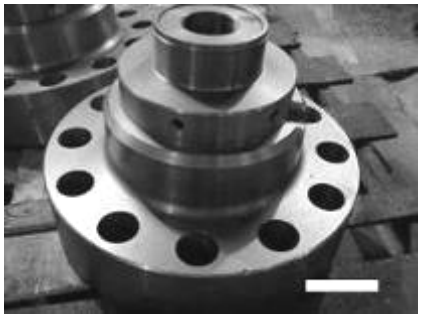
ASSEMBLY INSTRUCTIONS

The following steps have to be followed before assembly of any component of the FM1 gate valves.

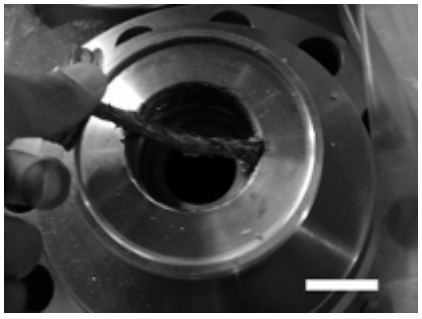
- Assembly work area must be clean and free of dirt, metallic shavings and wood particles.
- Surface preparation of work area should be metallic or covered with a layer of corrugated cardboard.
- All lubricants and utensils used in assembly must be clean.
- All tools used in assembly must be clean and in good working order.
- Clean all components (metallic) prior to assembly.
- Keep all elastomers and plastic base materials in bags or boxes until needed for assembly.
- Inspect all components for burrs, dings, marks, scrapes, nicks, and etc. prior to assembly.

UPPER / LOWER BONNET SUB-ASSEMBLY



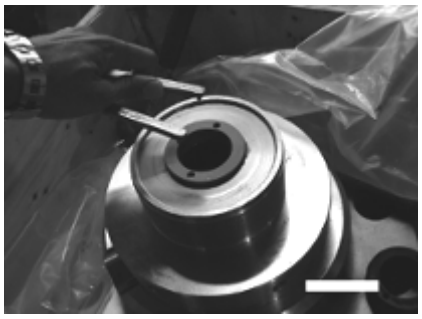
7 1/16” 10/15M FM1 bonnet before assembly

Insert a packing set into the bonnet as shown, and push it down.



Apply anti-seize compound to the inner threads of the bonnet.

Screw in the packing retainer.



Tighten the packing retainer with an expanding wrench.

Screw in the packing retainer locknut.

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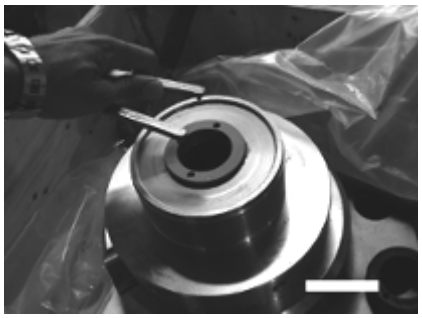
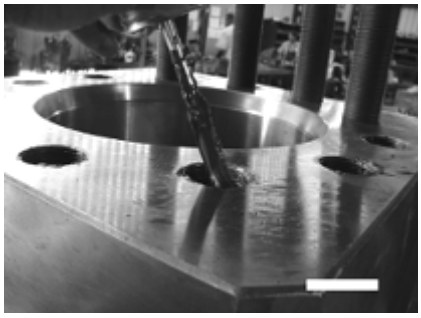
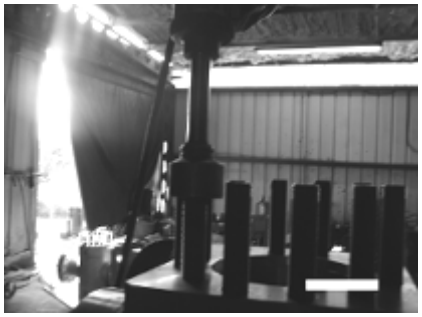


Tighten the packing retainer locknut with an expanding wrench as well.

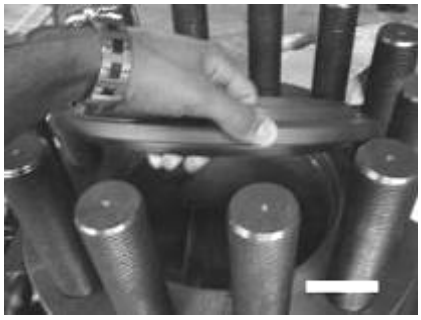
The next step is to insert the studs into the bottom of the valve body.



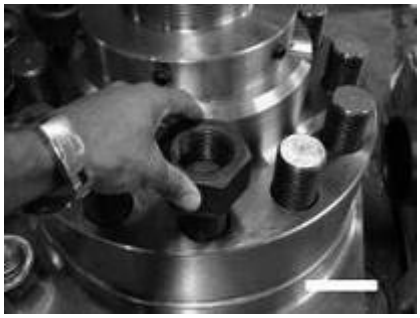
Coat the threads of the body/bonnet stud holes with anti-seize compound and screw in the studs.



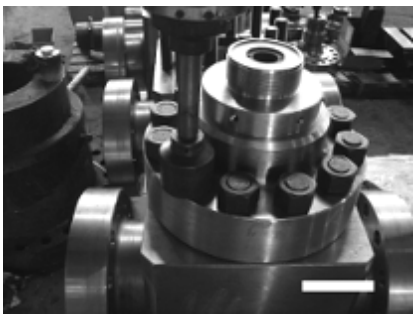
Tighten the studs using a certified impact wrench.



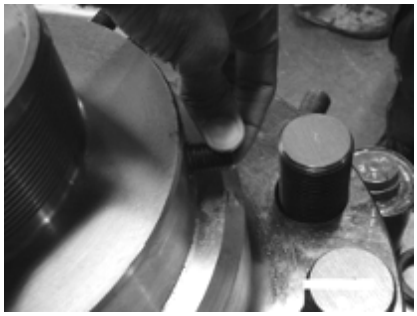
Insert the bonnet seal ring as shown.



Place the bonnet on the body over the studs and screw a hex nut onto each stud.



Tighten the hex nuts onto the studs using an impact wrench.



Coat a 5/8” set screw with anti-seize coat and screw into 6 gear attachment holes around the bonnet.

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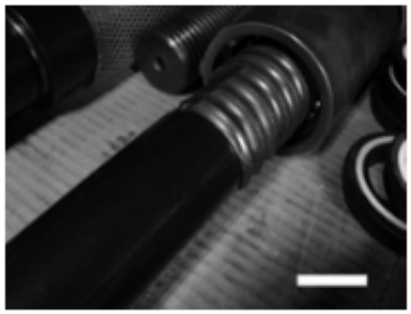
Tighten each of the set screws with a 5/8” Allen wrench.

Coat the outer threads and screw the balance stem protector down until tight.

NOTE: PLACE THE LOWER BONNET WHERE THE GREASE FITTING POINTS TOWARDS ONE OF THE NON-CONNECTED SIDES OF THE VALVE.

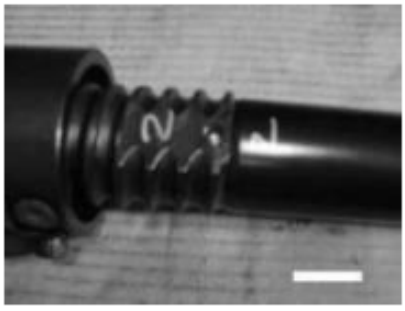
BALL SCREW PREPARATION

Screw the operating stem into the travel screw of the ball screw assembly.

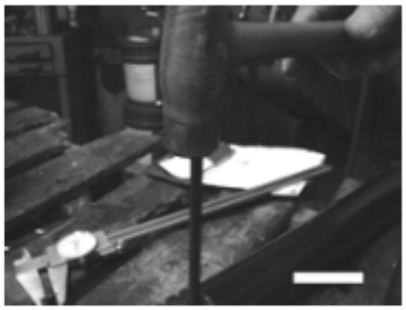


The shoulder of the stem should make contact with the bottom of the travel screw similar to the sample above.

CAUTION: Do not allow the travel screw to unscrew from the ball screw nut in either direction. This will cause the ball screw to de-ball itself.



When assembling more than one valve, it is a good idea to label or number the travel screw and its specific operating stem to ensure that the two will assemble correctly.



Mark the location of 2 socket set screw holes with a hammer and transfer punch.

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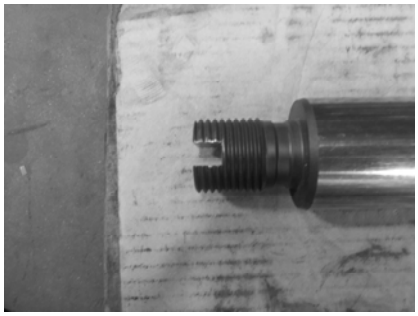
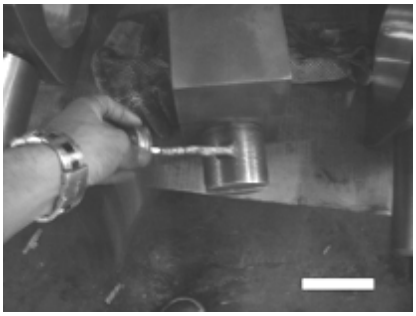
The transfer punch will leave an indentation in two places like the one shown above.

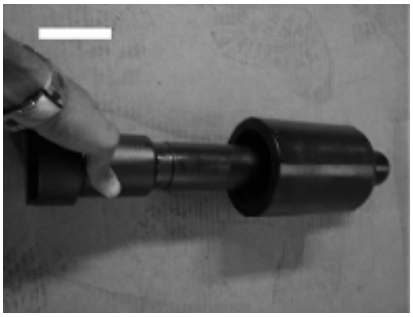


Unscrew the operating stem from the ball screw assembly, and drill 2 drill point depth holes at the marked locations with a 0.25” drill. The finished stem should appear similar to the one shown above.

GATE SUB ASSEMBLY



Coat the outer threads with anti-seize coating.



Insert the balance stem into the gate nut.

Align the balance stem into the slot of the gate, screw on the gate nut and tighten it with an oil filter wrench.

Insert 4 ¼”-20UNC socket screws around the gate nut and tighten them with an allen wrench.

NOTE: The placement of balance stem depends on whether the valve will be direct operating or reverse acting.

REPEAT THE STEPS FOR ASSEMBLY OF OPERATING STEM.

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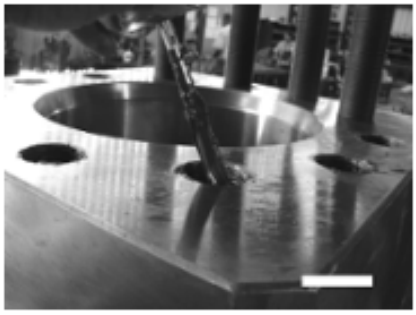
The completed gate assembly should appear similar to the one above.

BODY SUB ASSEMBLY



Coat the threads of the body/bonnet stud holes.

Insert the studs into the top of the valve body.

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Tighten the studs onto the body using a stud-tightening bolt and a certified impact wrench.

Grease the back and backside of the seats, grease and insert the external seal rings into the seal ring grove of each of the seats.

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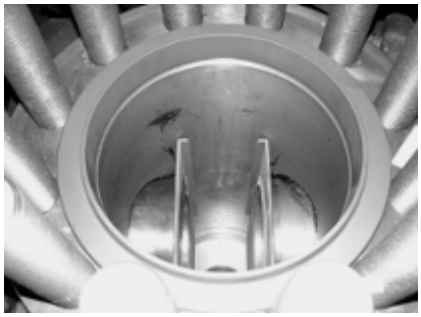
Insert the greased end of the seat into the seat pockets as shown.

Insert the gate guides on top of the seats as shown. **NOTE:** The flat side should be on the top.

Insert the bonnet seal ring.



The body cavity should appear as shown with the seats, gate guides and the bonnet seal ring.

Lower the gate assembly into the body. It should fit between the seats and gate guides while the balance stem travels thru the hole in the lower bonnet.

The operating stem should stand up as shown above.

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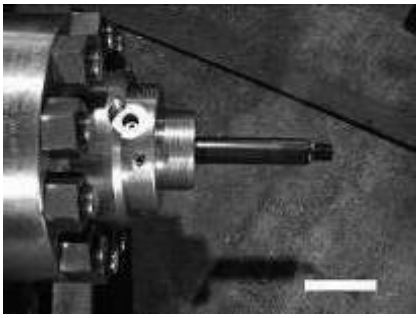
BALL SCREW SUB ASSEMBLY

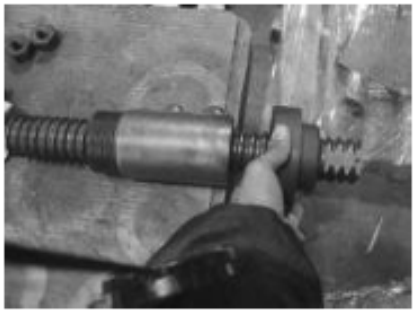


Raise the gate up until the stem is back seated. Then, lay the valve down. The operating stem should protrude as shown above.

Place a 350 o-ring on the lower bearing spacer as shown above.

Place the snap ring onto the other side of the lower bearing spacer.

Place the lower bearing spacer (snap ring end first) over the operating stem. Be careful not to scratch the stem.



Place the upper bearing spacer on the ball screw as shown above.

The ball screw should rest in the recess area on the spacer as shown.

Place a bearing-race set over the travel screw and onto the upper bearing spacer.

Screw the travel screw onto the top threads of the operating stem as shown above.

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If it is not already, unscrew the ball screw, with the upper bearing spacer and bearing-race set, to reveal 2 holes for socket set screws as shown above.

Adjust Lower Bearing Spacer where milled slot is in line with spring pin. Use a 3/8” spring pin to hold it in place.

Roll the ball screw nut, upper bearing spacer, and bearing-race set back onto the lower bearing spacer. Then, apply anti-seize compound to the threads of the ball screw nut as shown above.

Screw the stem adapter onto the ball screw nut as shown above.

Wipe any excess anti-seize compound from underneath the stem adapter and cover the upper bearing spacer and bearing-race set.

Weld the stem adapter to the ball screw nut as shown.

Place a bearing-race set onto the stem adapter as shown above.

Grease the lower bearing-race set that is between the upper and lower bearing spacers.

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Grease the upper bearing-race set that is resting on the stem adapter.

The greased ball screw assembly should appear very similar to the one shown above.

CAUTION: Do not allow the travel screw to unscrew from the ball screw nut in either direction. This can cause the ball screw to de-ball.

FINAL ASSEMBLY

Unscrew the ball screw assembly until there is approximately a 4.25” space between the bottom of the lower bearing spacer and the top of the upper bonnet. Use a jack-bolt to secure the space.

Coat the outer threads of the upper bonnet with anti-seize compound.

Insert and tighten 3 Alemite grease fittings into the 3 holes along the outside of the ball screw housing.

The top of the ball screw housing should appear as shown.

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Grease and insert the XLS bearing into the top of the ball screw housing.

Grease the inner surface of the ball screw housing and place the cover plate onto the greased surface.

Align the holes on the cover plate with the holes on the top of the ball screw housing, insert & tighten (4) ¼”-20UNC socket head cap screws thru the cover plate into the ball screw housing.

Place the ball screw housing over the stem adapter as shown above, and push the housing down until it rests on the bearing-race set.

Remove the jack-bolt, and the final assembly should appear similar to the assembly above.

Insert a snap ring into the snap ring groove which is located about 2 7/8 inches inside the ball screw housing.

After inserting the snap ring, push the ball screw housing onto the outer threads of the upper bonnet. Then, screw the ball screw housing onto the upper bonnet.

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Once the housing is on the threads, you can use a strap wrench to tighten it down. Again, you will periodically rotate the stem adapter counterclockwise to allow the housing to move.

Insert a ¼”-20 UNC tap bolt into the ball screw housing, and tighten it with a crescent wrench.

Lightly coat a ½” NPT grease fitting (or 9/16 Autoclave for 15 kpsi) with anti-seize compound, and insert it into the upper bonnet.

Tighten the grease fitting with an impact wrench.

NOTE: Periodically, turn the stem adapter counterclockwise to loosen the ball screw nut to allow the ball screw housing to screw on completely.

The finished upper bonnet assembly should appear as shown.

REPEAT THE STEPS FOR THE LOWER BONNET TOO.

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Place the hand wheel onto the stem adapter.

Tighten the hand wheel onto the stem adapter with a handwheel nut.

Place a 222 o-ring onto the gland backseat.

Screw the gland backseat into the stem adapter. Leave the stem adapter unscrewed about 0.500”.

Turn the hand wheel counterclockwise until it stops.

Screw the gland backseat into the stem adapter the rest of the way.

Measure the gap between the gland backseat and stem adapter with a Feeler gauge.

Unscrew the gland backseat and have the distance of the gap trimmed off the thread side of it.

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Coat the trimmed gland backseat with anti-seize compound.

Screw it back into the stem adapter completely.

PERIODIC MAINTAINANCE

The Model FM1 gate valves are non-lubricated valves, in that they do not require the injection of lubricants or sealants to effectively seal. However, to prevent corrosion and excessive wear a normal amount of lubrication is recommended to extend the life and serviceability of the valve.

Maintenance Tools
To perform normal maintenance and lubrication, the following tools are recommended:

Grease pump with adapter and coupling

Safety pressure releasing tool

Valveworks USA API Gate Valves at 15,000 PSI W.P. are supplied with 9/16" 17-4SS autoclave fitting connections.

BALL SCREW BEARING LUBRICATION

Valveworks USA FM1 valves are equipped with alemite hydraulic type 1/8" NPT bonnet grease fittings. Ball Screw bearing lubrication is accomplished through this fitting using a standard type grease gun. Any good grade No. 3 grease is recommended for this lubrication. Ball screw bearings normally do not require great amounts of grease. If too much lubrication should occur, excess grease will flow around the stem to the atmosphere.

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CAUTION: If bearings should need to be changed, the valve must be removed from service. During pressurized valve body lubrication, pressure applied to the valve body with the grease gun must not exceed the maximum working pressure of the valve being lubricated.

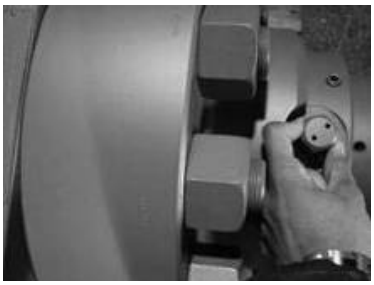
VENTING OR DRAINING A VALVE

Most products contain a certain amount of water, line scale, sediment and other foreign matter which tend to accumulate in the valve body. A regular draining program will increase the life of a valve against damage caused by:

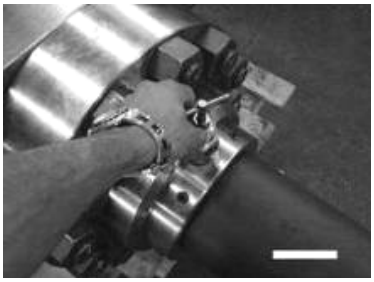
- Water freezing in the body cavity, causing damage to the body.
- An accumulation of foreign matter in the lower part of the body, which could prevent the valve from fully closing, resulting in a throttling action which may cause inefficient sealing.
- Foreign matter trapped in the body may become lodged between the sealing surfaces of the gate and seats, resulting in scored or damaged sealed.
- Venting a Model FM1 valve is a positive method of checking the sealing ability of the gate and seats. If the body vents down to zero pressure with the valve in fully closed position, this is definite indication that sealing surfaces are in good condition.

PROCEDURE TO VENT OR DRAIN

- Place the valve gate in a fully opened or fully closed position.



Remove the safety cap from either body grease fitting



Attach the pressure release tool.

CAUTION: Remove the safety cap slowly to allow the ball check to sufficiently seal and avoid uncontrolled venting. Should the ball check fail to seal properly, pressure will continue to blow through the safety cap orifices. You should then retighten the safety cap screw and vent through the other body grease fitting. Once the body pressure is bled to zero you should then attempt to repair the leaking ball check.

- Screw the stem of the releasing tool into the fitting forcing the ball check off its seat. The valve will vent and drain once the ball check is unseated.

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A program of regular draining and body venting is the most positive way to prevent problems caused by foreign matter in the valve. However, if a regular draining program cannot be followed, it is recommended that valves be drained after the following operations:

- After a well has come in and has been cleaned up.
- After a mudding operation.
- After a cementing operation.
- Anytime the valve seems hard to operate by hand and will not fully open or close by the required number of hand wheel turns.
- When the valve is hard to operate from the fully open or fully closed position because it is "pressure locked" or "Iced-up".

"Pressure locked" is a condition that may exist with any dual seat expanding type gate valve when body pressure greatly exceeds line pressure. It occurs only in fully closed position and is a positive indication that sealing surfaces are in good condition.
"Iced-up" is a condition caused by a restriction in the flow or a differential in the pressure of gas flow at high pressure, which produces extremely low temperatures.

These restrictions or differentials in pressure may be caused by throttling through a valve, by leakage of a closed valve or by Leakage through the stem packing. Valves in service on gas containing hydrates or in fresh water service, exposed to low external temperatures may also "iced-up". In this case it is advisable to inject alcohol or glycol into the valve body through the drain fitting to combat these conditions.

The same procedures are used for injecting alcohol or glycol as are used for valve body lubrication. Do not operate the valve immediately after injecting as these fluids should be retained in the body to perform the Antifreeze effect.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Leakage when closed	Seats	Disconnect from service and check for the condition of the seats.
Leakage when open through body/bonnet connection	Bonnet Seal Ring	Disconnect from service and replace the bonnet seal ring
Leakage when partially open thru top of bonnet	Packing	Disconnect from service and replace the packing
Leakage at flange	Flange Seal Ring	Disconnect from service and replace the flange seal ring.

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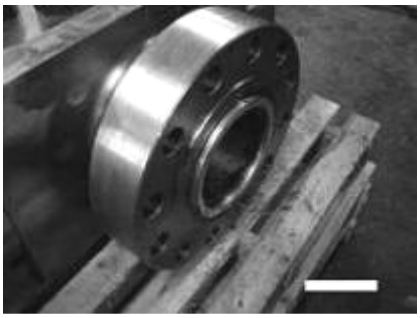
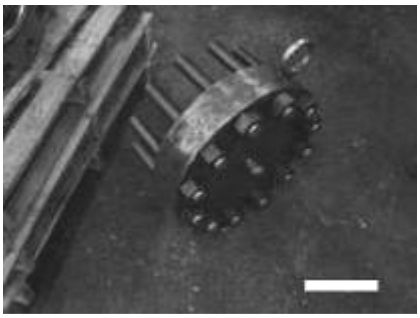
MAINTAINANCE INTERVALS

Procedure	Recommended Interval
Vent or Drain	See Page
Cycle Open to Close	Semi-Annually
Disconnect and Test	Annually

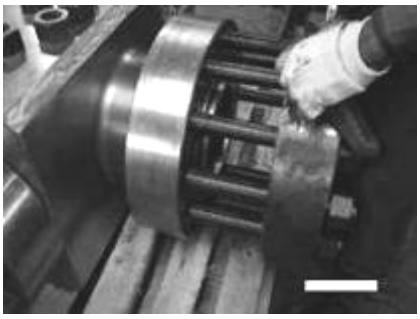
TEST PROCEDURE



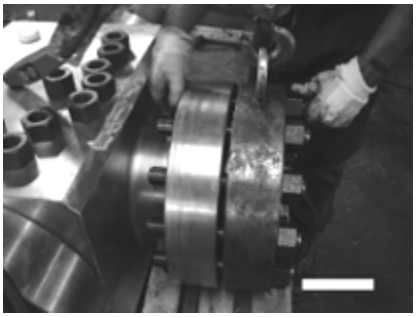
Grease and insert a BX156 ring joint into one of the body flanges. Note: Refer to the end of the manual for studded outlet to prepare for testing.



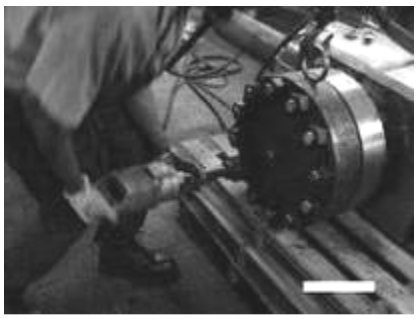
Be sure that the test flange has a tightened grease fitting, all of its studs, and a nut on each with all of the nuts on the grease fitting side as shown.



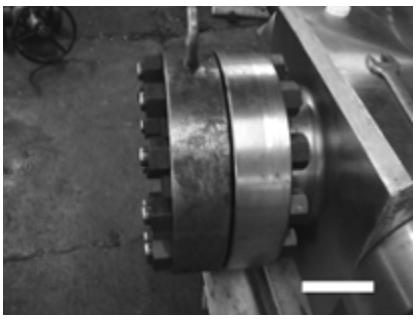
Align the test flange studs with the body flange holes. Then, push the test flanges, its studs, and their hex nuts onto the body flange.



Screw the each hex nut on the vacant side of a stud as shown until all of the studs have a nut on the test flange and the valve flange.



Tighten the hex nuts on the test flange side with an impact wrench until they are tight.



A finished flange should appear as shown.

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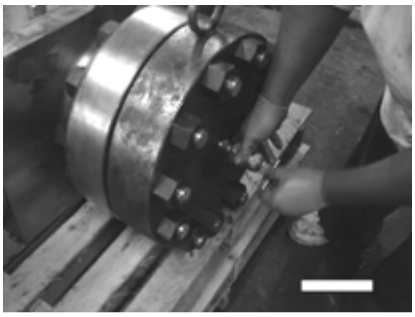
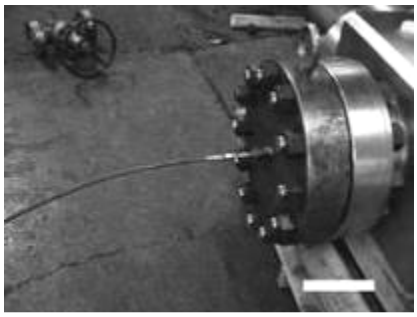
NOTE: Repeat the above steps for the opposite flange.



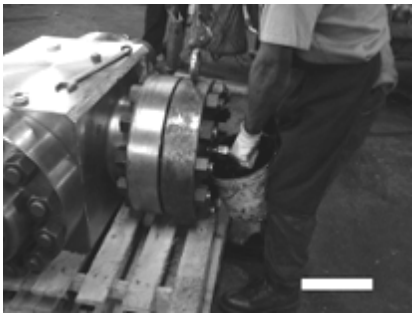
Remove the grease fitting cap from one test flange and attach a pressure release tool as shown above.



Remove the grease fitting cap from the opposite test flange and attach the flow line as shown above.

Hydrostatic Body Test

- With the pressure release tool and flow line connection tight, open the valve partially, and apply the test pressure for at least three (3) minutes.



Bleed off the pressure until it's reduced to zero, and close the pressure release tool.

- Raise the pressure back up to the test pressure for the secondary pressure-holding period of at least three (3) minutes.
- Bleed off the pressure until it's reduced to zero. Then, close the pressure release tool and the valve.

The hydrostatic body test pressure shall be determined by the rated working pressure of the equipment. Hydrostatic test pressures shall be as given as tabulated below.

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HYDROSTATIC BODY TEST PRESSURE, PSI (MPa)

Working Pressure Rating - PSI (Mpa)		End and Outlet Connections - PSI (Mpa)		Line Pipe and Tubing Threads - PSI (Mpa)	
2,000	(13,8)	4,000	(27,6)	4,000	(27,6)
3,000	(20,7)	6,000	(41,4)	6,000	(41,4)
5,000	(34,5)	7,500	(51,7)	7,500	(51,7)
10,000	(69,0)	15,000	(103,4)	15,000	(103,4)
15,000	(103,4)	22,500	(155,2)	-	-
20,000	(138,0)	30,000`	(207,0)	-	-

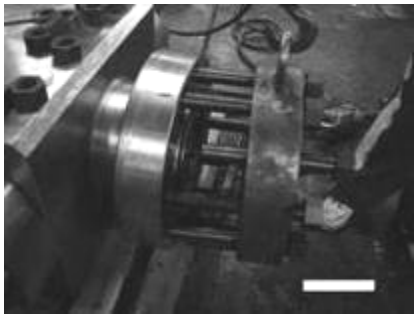
Hydrostatic Seat Test

- With the valve closed, apply the rated working pressure.
- Hold and monitor at that pressure for at least three (3) minutes.
- Open the valve, and bleed off the pressure until it's reduced to zero. Then, close the valve and the pressure release tool.
- Repeat the steps above.

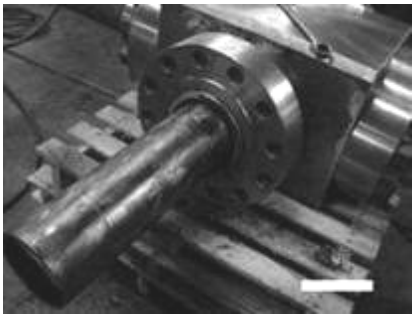
Switch the sides of your flow and pressure release connections, bleed off the new pressure release side, and repeat steps above to perform a seat test on the new flow side.

The valve is acceptable if no leakage is visible during the holding period.

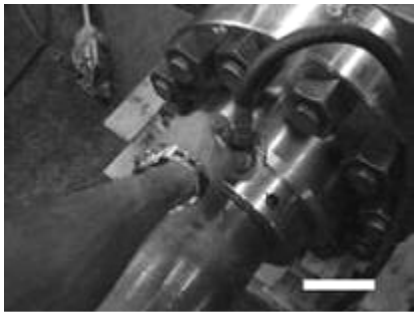
While holding the hex nuts on the body flange, loosen each of the test flange hex nuts.



After removing the body flange hex nuts, you can remove the test flange, its studs, and their hex nuts.



Pass a drift mandrel through the valve bore after the valve has been assembled, operated, and pressure tested.



Remove the upper bonnet grease fitting cap, and attach a flow line from the grease pump to the grease fitting as shown above.

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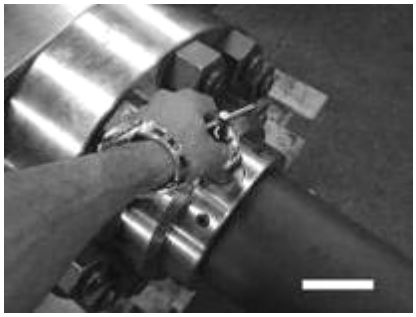
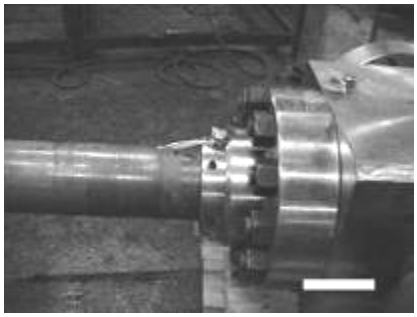
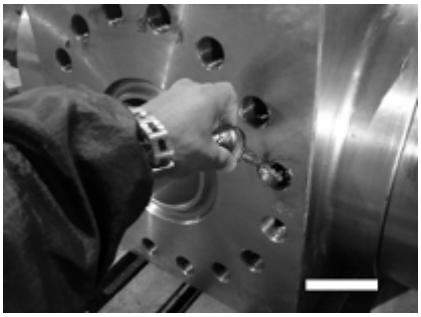


Remove the lower bonnet grease fitting cap, and attach a pressure release tool as shown above.

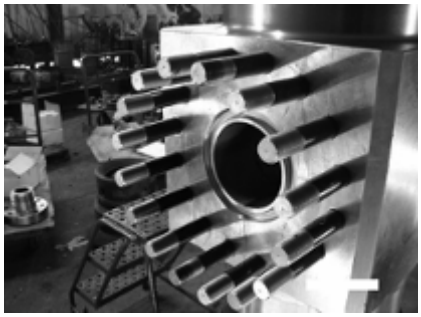


After the valve is accepted, it is tagged with a green or blue tag before being painted.

STUDDED OUTLET INSTALLATION/ TESTING



Coat the threads of each hole with anti-seize compound.



Screw the 1.50” thread length side of each pad stud into an empty, coated hole.

Grease and insert the BX156 ring joint into the valve ring groove.

Tighten each stud with a pipe wrench.

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Place a test flange, with a grease fitting installed, onto the studs.

Lightly coat the exposed threads of the pad stud with anti-seize compound.

Screw a hex nut onto each of the exposed pad studs.

Tighten the hex nuts with a certified impact wrench.

Repeat the above steps to install the other test flange.

NOTE: A test flange is shown in this manual, but the service flange will use the same nuts and bolt circle.

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VISUAL INSPECTION

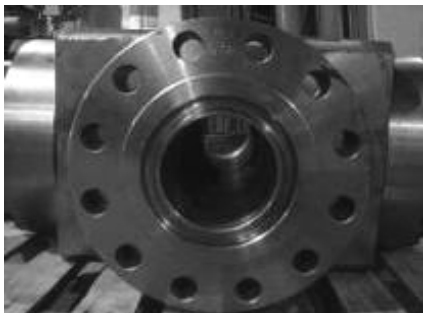
Before installing a Valveworks USA Model FM1 valve in the field, here are a few items to visually inspect:

Be sure the upper bonnet grease fitting cap is on and tight.

Be sure the upper bonnet grease fitting cap is on and tight.

Be sure the Alemite fittings are on and tight.

Be sure the Hand wheel Nut is tight



Be sure the gate is in the fully open or fully closed position

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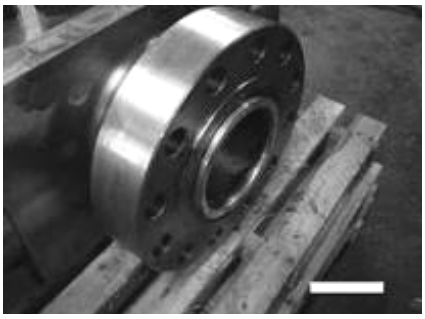
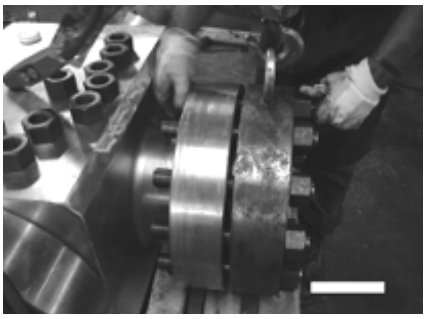
FIELD HOOK UP INSTRUCTIONS

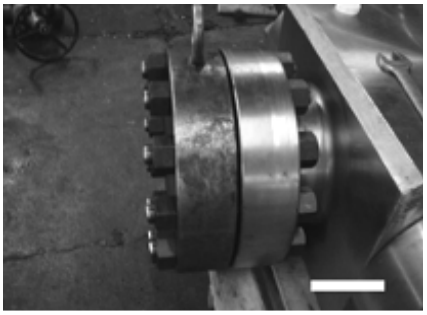


Grease and insert ring joint into the valve flange.



Align the service flange holes with the body flange holes. Push a stud thru each aligned hole until there is a stud thru each hole. Screw a hex nut on both sides of each stud by hand.

Torque the service flange hex nuts with a certified torque gun until they are tight.



A finished flange should appear as shown.

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